ECORD
AND
RIEFS

Supreme Court, U.S.
FILED
SEP - 1 2017
OFFICE OF THE CLERK

No. 16-1161

In the Supreme Court of the United States

BEVERLY R. GILL, ET AL.,
Appellants,

v.

WILLIAM WHITFORD, ET AL.,
Appellees.

On Appeal from the United States District Court for the Western District of Wisconsin

BRIEF OF 44 ELECTION LAW, SCIENTIFIC EVIDENCE, AND EMPIRICAL LEGAL SCHOLARS AS *AMICI CURIAE* IN SUPPORT OF APPELLEES

Andrew Chin
University of North Carolina
School of Law
160 Ridge Road, CB #3380
Chapel Hill, NC 27599-3380
chin@unc.edu
(919) 962-4116

September 1, 2017

Counsel for Amici Curiae

TABLE OF CONTENTS

Page

TABLE OF AUTHORITIES iv

INTEREST OF *AMICI CURIAE* 1

SUMMARY OF ARGUMENT 1

ARGUMENT 3

I. THIS COURT SHOULD AFFIRM THE PANEL'S DETERMINATION THAT THE PARTISAN EFFECT OF THE APPLICATION OF POLITICAL CLASSIFICATIONS IN THE DRAFTING OF ACT 43 WAS NOT JUSTIFIABLE. 3

A. Adjudication of a partisan gerrymandering claim requires scrutiny of the computer-assisted districting process, not just the plan it produced. 5

B. Decision science provides a computational criterion for showing that a computer-assisted districting process applied political classifications in a way unrelated to any legitimate legislative objective 6

C. The Panel's findings support the determination that Act 43's drafters applied political classifications in a way unrelated to any legitimate legislative objective 11

1. The Panel found that the process of alternative map generation resulting in Act 43's drafting was suffused with partisan considerations. 11

2. The Panel's findings support the determination that Act 43's drafters consulted traditional districting principles and other legitimate legislative objectives only as feasibility constraints. 12

3. Act 43 bore the hallmarks of a drafting process wherein partisan considerations were applied as goals and traditional districting principles were consulted only as feasibility constraints. 14

II. THIS COURT SHOULD AFFIRM THE PANEL'S CAUSAL DETERMINATION THAT PARTISAN CONSIDERATIONS IN THE DRAFTING OF ACT 43 HAD THE LIKELY EFFECT OF ENTRENCHING A REPUBLICAN PARTISAN ADVANTAGE THROUGHOUT THE LIFE OF THE PLAN. 16

A. The Panel's causal determination is entitled to deference on appeal, especially in light of the technical nature of this determination. 17

B. The Panel properly weighed the evidence relating to the plaintiffs' causal and predictive claims. 19

1. The Panel properly weighed the evidence relating to the plaintiffs' causal claim that partisan considerations in the drafting of Act 43 were a substantial cause of the Republican partisan advantages observed in 2012 and 2014..... 20

2. The Panel properly weighed the evidence relating to the plaintiffs' predictive claim that given the extent of the partisan advantages observed in 2012 and 2014, Republicans will likely continue to enjoy a partisan advantage for the life of Act 43. 26

CONCLUSION..... 31

APPENDIX – LIST OF SIGNATORIES..... 1A

TABLE OF AUTHORITIES

Page

CASES

Anderson v. Bessemer City,
470 U.S. 564 (1985) 18

Arizona State Legislature v. Arizona Independent Redistricting Com'n,
135 S.Ct. 2652 (2015) 16

Davis v. Bandemer, 478 U.S. 109 (1986)..... 19

Dothard v. Rawlinson,
433 U.S. 321 (1977) 18

General Elec. Co. v. Joiner,
522 U.S. 136 (1997) 19

Heller v. Shaw Industries, Inc.,
167 F.3d 146 (3rd Cir. 1999) 25

Kannankeril v. Terminix Int'l, Inc.,
128 F.3d 802 (3rd Cir. 1997) 25, 26

Karcher v. Daggett,
462 U.S. 725 (1983) 5

Knight v. Kirby Inland Marine Inc.,
482 F.3d 347 (5th Cir. 2007) 21

League of United Latin American Citizens v. Perry,
548 U.S. 399 (2006) 9, 17, 27

Sedor v. Frank,
42 F.3d. 741 (2d Cir. 1994)..... 18

Soria v. Ozinga Bros., Inc.,
704 F.2d 990 (7th Cir. 1983) 18

TMJ Implants, Inc. v. Aetna, Inc.,
498 F.3d 1175 (10th Cir. 2007) 21

United States v. Abel,
469 U.S. 45 (1984) 19

U.S. Postal Service Board of Governors v. Aikens,
460 U.S. 711 (1983) 18

Vieth v. Jubelirer,
541 U.S. 267 (2004) ..... *passim*

Westberry v. Gislaved Gummi AB,
178 F.3d 257 (4th Cir. 1999) 24, 25

Whitford v. Gill,
218 F.Supp.3d 837 (W.D. Wis. 2016) ..... *passim*

Wood v. Textron, Inc.,
807 F.3d 827 (7th Cir. 2015) 23

STATUTES AND RULES

Sup. Ct. R. 37.6 1

OTHER MATERIALS

Micah Altman, *The Computational Complexity of Automated Redistricting: Is Automation the Answer?*,
23 RUTGERS COMP. & TECH. L.J. 81 (1997) 7

Sachet Bangia *et al.*, *Redistricting: Drawing the Line*,
https://arxiv.org/abs/1704.03360 10

JONATHAN BENDOR, BOUNDED RATIONALITY AND POLITICS (2010) 7

Michelle H. Browdy, *Simulated Annealing: An Improved Computer Model for*

Political Redistricting,
8 YALE L. & POL'Y REV. 163 (1990) 7

Jowei Chen & Jonathan Rodden, *Cutting Through the Thicket: Redistricting Simulations and the Detection of Partisan Gerrymanders*,
14 ELECTION L.J. 331 (2015) 10

Wendy K. Tam Cho & Yan Y. Liu, *Toward a Talismanic Redistricting Tool: A Computational Method for Identifying Extreme Redistricting Plans*,
15 ELECTION L.J. 351 (2016) 10

David L. Faigman *et al.*, *Group to Individual (G2i) Inference in Scientific Expert Testimony*,
81 U. CHI. L. REV. 417 (2014)..... 24

FEDERAL JUDICIAL CENTER, REFERENCE MANUAL ON SCIENTIFIC EVIDENCE (1994) 23

SIMON FRENCH ET AL., DECISION BEHAVIOUR, ANALYSIS AND SUPPORT (2009)..... 6, 7, 8

Michael D. Green *et al.*, *Reference Guide on Epidemiology*, *in*
FEDERAL JUDICIAL CENTER, REFERENCE MANUAL ON SCIENTIFIC EVIDENCE 549 (3d ed. 2011)..... 24, 25

Simon Jackman, *Assessing the Current Wisconsin State Legislative Districting Plan* (July 7, 2015) 21, 28, 29, 30, 31

Simon Jackman, *Rebuttal Report* (Dec. 21, 2015)..... 29

David H. Kaye & David A. Freedman, *Reference Guide on Statistics*, *in*

FEDERAL JUDICIAL CENTER, REFERENCE MANUAL ON SCIENTIFIC EVIDENCE 83 (3d ed. 2011) 21

Yan Y. Liu *et al.*, *PEAR: A Massively Parallel Evolutionary Computation Approach for Political Redistricting Optimization and Analysis*, 30 SWARM & EVOLUTIONARY COMP. 78 (2016) 10

Kenneth Mayer, *Rebuttal Report: Response to Expert Reports of Sean Trende and Nicholas Goedert* (Dec. 21, 2015) 27

Eric McGhee, *Measuring Partisan Bias in Single-Member District Electoral Systems*, 39 LEGIS. STUD. Q. 55 (2014) 20

PAUL R. ROSENBAUM, DESIGN OF OBSERVATIONAL STUDIES (2010) 30

Satisfice, RANDOM HOUSE DICTIONARY (2017), http://dictionary.com/browse/satisfice 7

HERBERT A. SIMON, MODELS OF MAN: SOCIAL AND RATIONAL (1957) 7

Herbert A. Simon, *On the Concept of Organizational Goal*, 9 ADMIN. SCI. Q. 1 (1964). 8, 9

Nicholas Stephanopoulos, *Race, Place, and Power*, 68 STAN. L. REV. 1323 (2016) 21

Nicholas O. Stephanopoulos & Eric M. McGhee, *Partisan Gerrymandering and the Efficiency Gap*, 82 U. CHI. L. REV. 831 (2015)..... 20

JOHN L. THOMPSON & FRANK MARTIN, STRATEGIC MANAGEMENT: AWARENESS AND CHANGE (2010)..... 8, 14

Adrian Vermeule, *Three Strategies of Interpretation*, 42 SAN DIEGO L. REV. 607 (2005)..... 7

INTEREST OF *AMICI CURIAE*[1]

Amici are forty-four scholars of election law, scientific evidence, and empirical legal methods at law schools and universities throughout the United States. We have no personal interest in the outcome of this case (except to the extent that it may affect our electoral influence as individual voters), but we have a professional interest in seeing that the law relating to the application of scientific and statistical evidence develops in a way that supports and encourages methodologically sound practices.

SUMMARY OF ARGUMENT

The Panel adopted, and found Act 43 liable under, a three-pronged test for unconstitutional gerrymandering that prohibits any "redistricting scheme which (1) is intended to place a severe impediment on the effectiveness of the votes of individual citizens on the basis of their political affiliation, (2) has that effect, and (3) cannot be justified on other, legitimate legislative grounds." *Whitford v. Gill*, 218 F.Supp.3d 837, 884 (W.D. Wis. 2016). In the course of factfinding, the Panel weighed and drew inferences from an extensive corpus of scientific and statistical evidence in the trial record. This brief highlights and explains methodologically sound practices for statistical, causal, and predictive

---

[1] Pursuant to Supreme Court Rule 37.6, counsel for *amici* represents that he authored this brief in its entirety and that none of the parties or their counsel made a monetary contribution intended to fund the preparation or submission of this brief. Counsel for *amici* also represents that Counsel of Record for both parties have consented to the filing of this *amicus* brief, and that letters reflecting their blanket consent to the filing of *amicus* briefs have been filed with the Clerk.

inferences in the Panel's adjudication of the discriminatory effect and justification prongs. *Amici* file this brief in support of plaintiff-appellees because we conclude that the Panel admitted and weighed the relevant evidence without abusing its discretion or committing clear error, and the record of this case provides substantial support for each of the Panel's inferences and findings.

Part I addresses the justification prong by explaining how the computationally intensive nature of the modern redistricting process makes it amenable to judicial scrutiny through the lens of decision science. Despite the general conceptual difficulty of separating mixed motives, the Panel's findings bring to light a disjunction between (1) the Act 43 drafters' pursuit of partisan objectives in generating alternative maps and (2) their consultation of feasibility constraints when checking these maps for compliance with traditional districting principles. This disjunction yields, in computational terms, the determination that the drafters applied political classifications in a way unrelated to any legitimate legislative objective.

Part II characterizes the Panel's analysis under the discriminatory effect prong as a causal determination entitled to deference on appeal and premised on interrelated causal and predictive claims. The causal claim is that partisan considerations in the drafting of Act 43 were a substantial cause of the Republican partisan advantages observed in the 2012 and 2014 election results. The predictive claim is that given the extent of the partisan advantages observed in 2012 and 2014, Republicans will likely continue to enjoy a partisan advantage for the life of Act 43. The Panel properly reviewed and drew valid inferences

from the scientific and statistical evidence concerning both of these claims.

While *amici* believe the Panel's three-pronged test provides an appropriate framework for the constitutional adjudication of partisan gerrymandering claims, the scope of this brief is limited to explaining why the Panel's factual determinations with respect to the discriminatory effect and justification prongs of this test abundantly warrant affirmance.

ARGUMENT

I. This Court should affirm the Panel's determination that the partisan effect of the application of political classifications in the drafting of Act 43 was not justifiable.

The law has yet to catch up to the technology of partisan gerrymandering. In *Vieth v. Jubelirer*, 541 U.S. 267 (2004), the plurality opinion acknowledged that "an excessive injection of politics [in districting] is unlawful," *id.* at 293, but concluded from the eighteen-year absence of judicially discernible and manageable standards for such claims that none would ever be forthcoming. *See id.* at 281. Justice Kennedy's concurrence, however, took a longer view regarding the potential emergence of "suitable standards with which to measure the burden a gerrymander imposes on representational rights." *Id.* at 313 (Kennedy, J., concurring in the judgment). He identified the "rapid evolution of technologies in the apportionment field" as presenting both a potential "threat" in the hands of those who would "use partisan favoritism in districting in an unconstitutional manner," and a potential "promise"

as a source of "new methods of analysis ... [t]hat would facilitate court efforts to identify and remedy the burdens, with judicial intervention limited by the derived standards." *Id.* at 312-13.

In anticipation of the eventual emergence of new legal standards and analytical methods, Justice Kennedy opined that liability for partisan gerrymandering "must rest on something more than the conclusion that political classifications were applied," and "must rest instead on a conclusion that the classifications, though generally permissible, were applied in an invidious manner or in a way unrelated to any legitimate legislative objective." *Id.* at 307.

In this case, the Panel made factual findings concerning "whether [Act 43's] partisan effect is justifiable; *i.e.*, whether it can be explained by the legitimate state prerogatives and neutral factors that are implicated in the districting process," with the stated aim of "hew[ing] as closely as possible" to Justice Kennedy's views and this Court's other political gerrymandering opinions. *Whitford*, 218 F.Supp.3d at 911 (citations omitted). These findings included the Panel's specific determination that Wisconsin's natural "political geography cannot explain the burden that Act 43 imposes on Democratic voters." *See id.* at 926.

As explained *infra*, the Panel's findings also demonstrated, in the stark terms of decision science, that the drafters applied political "classifications . . . in a way unrelated to any legitimate legislative objective." *Vieth*, 541 U.S. at 307 (Kennedy, J., concurring). In so doing, the findings not only directly addressed Justice Kennedy's views on

liability, but also answered his call for new jurisprudential methods.

A. Adjudication of a partisan gerrymandering claim requires scrutiny of the computer-assisted districting process, not just the plan it produced.

"[L]egislatures, experts, and courts" alike use powerful software tools "to map electoral districts in a matter of hours, not months," *Vieth*, 541 U.S. at 312 (Kennedy, J., concurring), reflecting the value-neutrality of the technology that has transformed redistricting into a computationally intensive decision-making process. Legislatures have long been able to use computer technology to help ensure that districts comply with traditional districting principles and further other legitimate objectives. *See Karcher v. Daggett*, 462 U.S. 725, 733 (1983) ("The rapid advances in computer technology and education during the last two decades make it relatively simple to draw contiguous districts of equal population and at the same time to further whatever secondary goals the State has."). At the same time, lawmakers can use the very same technology to pursue partisan advantage, if they are so inclined. *Vieth*, 541 U.S. at 312 (Kennedy, J., concurring) (describing the "threat" of technology enabling those who would "use partisan favoritism in districting"); *id.* at 345 (Souter, J., dissenting) ("[T]he increasing efficiency of partisan redistricting has damaged the democratic process to a degree that our predecessors only began to imagine."); *id.* at 364 (Breyer, J., dissenting) ("[T]he political advantages of a gerrymander may become ever greater in the future" due to "enhanced computer technology").

Armed with "highly sophisticated mapping software" and detailed census data, drafters can even "pursue partisan advantage without sacrificing compliance with traditional districting criteria." *Whitford*, 218 F.Supp.3d at 889. As a consequence, "[a] map that appears congruent and compact to the naked eye may in fact be an intentional and highly effective partisan gerrymander." *Id.*; *see also Vieth*, 541 U.S. at 298 (plurality opinion) ("[P]acking and cracking, whether intentional or no, are quite consistent with adherence to compactness and respect for political subdivision lines.").

For this reason, a partisan gerrymandering claim cannot be dismissed simply because a computer-assisted districting process produced a plan that complies with traditional districting criteria. *See Vieth*, 541 U.S. 298 (plurality opinion) ("[I]t certainly cannot be that adherence to traditional districting factors negates any possibility of intentional vote dilution."). Judicial scrutiny of the computer-assisted districting process itself is needed to determine whether political "classifications, though generally permissible, were applied . . . in a way unrelated to any legitimate legislative objective." *Id.* at 307 (Kennedy, J., concurring).

B. Decision science provides a computational criterion for showing that a computer-assisted districting process applied political classifications in a way unrelated to any legitimate legislative objective.

The adjudicative task of discerning the intended goals guiding a rational actor's use of a computer-based decision support system falls squarely within the ambit of decision science. *See* SIMON FRENCH ET

AL., DECISION BEHAVIOUR, ANALYSIS AND SUPPORT 81-85 (2009) (surveying various approaches to decision analysis and computer-based decision support).

Decision science captures both the "threat" and the "promise" of computer-assisted districting described in Justice Kennedy's *Vieth* concurrence. 541 U.S. at 312. In the language of decision science, software threateningly enables lawmakers who are so inclined to approach redistricting computationally as a constrained optimization (or, alternatively and more realistically, satisficing) problem,[2] wherein the

---

[2] To satisfice is "to choose or adopt the first satisfactory option that one comes across." *Satisfice*, RANDOM HOUSE DICTIONARY (2017), at http://dictionary.com/browse/satisfice (visited Aug. 2, 2017); *see also* FRENCH, *supra*, at 28 ("satisficing ... involves establishing a minimum standard for each attribute of an action or outcome and then choosing the first alternative that meets these standards"); Adrian Vermeule, *Three Strategies of Interpretation*, 42 SAN DIEGO L. REV. 607, 610 (2005) ("The satisficer searches only until finding a choice whose outcomes are good enough.").

The satisficing strategy is a rational approach to problems in redistricting in light of their complexity, *compare* Michelle H. Browdy, *Simulated Annealing: An Improved Computer Model for Political Redistricting*, 8 YALE L. & POL'Y REV. 163, 171 n.21 (1990) (suggesting a satisficing approach to computational redistricting as a reasonable alternative if optimization is computationally unachievable) *with* Micah Altman, *The Computational Complexity of Automated Redistricting: Is Automation the Answer?*, 23 RUTGERS COMP. & TECH. L.J. 81, 94-112 (1997) (arguing that constrained optimization problems in redistricting are probably computationally intractable), and in light of the bounded rationality of the decision makers. *See* JONATHAN BENDOR, BOUNDED RATIONALITY AND POLITICS 29 (2010) ("The heart of satisficing models is the assumption that a decision maker has an internal standard, an aspiration level, which partitions all current payoffs into two sets: satisfactory and unsatisfactory."); HERBERT A. SIMON, MODELS OF MAN:

intended objective is to achieve the maximal (or, alternatively, some satisfactory) degree of partisan advantage, subject to the feasibility constraint that the plan comply with traditional districting principles. *See* FRENCH, *supra*, at 141-148 (introducing constrained optimization and illustrating its use in operations research); *id.* at 28-29 (introducing satisficing); *id.* at 143 (describing feasibility constraints as the "relationships that must hold between [the] different decision variables" that comprise the problem's "search space").

But steadfastly treating traditional districting principles as feasibility constraints, rather than objectives, can also promisingly set the stage for a showing of unconstitutional partisan gerrymandering. As Nobel laureate Herbert Simon observed, in real-life situations where the set of possible actions is not known in advance but "must be discovered, designed, or synthesized," the decision maker must engage in a process of "alternative generation" guided by the decision maker's goals and "alternative testing" against constraints for membership in the feasible set. *See* Herbert A. Simon, *On the Concept of Organizational Goal*, 9 ADMIN. SCI. Q. 1, 7-8 (1964). Simon explains that, in these situations, the process of designing alternative plans will reveal a fundamental disjunction "between the goals that guide the actual synthesis and the constraints that determine whether possible courses of action are in fact feasible." *Id.* at 8; *see also* JOHN L. THOMPSON & FRANK MARTIN, STRATEGIC MANAGEMENT: AWARENESS AND CHANGE 279 (2010)

SOCIAL AND RATIONAL 196 (1957) (describing satisficing as a form of "intendedly rational" decisionmaking).

(describing Simon's explanation as an "important distinction" between objectives and constraints and providing examples where legal compliance functions as a feasibility constraint). The final decision resulting from this process may also "depend considerably on the search process, that is, on which requirements serve as goals or generators, in the sense just defined, and which as constraints or tests." Simon, *supra*, at 8.

Simon's disjunction between goals and constraints will be self-evident in any partisan gerrymandering case where partisan goals are seen to guide the generation of alternative maps, and legitimate legislative objectives have been consulted only as feasibility constraints. In such a case, a reviewing court may immediately conclude that partisan "classifications, though generally permissible, were applied ... in a way unrelated to any legitimate legislative *objective*." *Vieth*, 541 U.S. at 307 (Kennedy, J., concurring) (emphasis added).

Some other computer-assisted districting processes may not admit of such a straightforward characterization. The process of drafting Act 43, however, did not even involve quantitative comparisons among legitimate legislative objectives, *Whitford*, 218 F.Supp.3d at 921, let alone the challenging but still potentially solvable computational problem of untangling mixed motives.[3] Instead, as the Panel's findings reviewed

---

[3] Given the difficulty of separating mixed motives, this Court might be inclined to immunize partisan considerations from constitutional review whenever they have been computationally commingled with legitimate legislative objectives. *See League of United Latin American Citizens v. Perry*, 548 U.S. 399, 418 (2006) (citation omitted) ("Evaluating the legality of acts arising

out of mixed motives can be complex, and affixing a single label to those acts can be hazardous... When the actor is a legislature and the act is a composite of manifold choices, the task can be even more daunting."); *see also Vieth*, 541 U.S. at 307 (Kennedy, J., concurring) (describing political classifications as "generally permissible" unless "applied in an invidious manner or in a way unrelated to any legitimate legislative objective").

Such a categorical judicial retreat in the face of computational complexity, however, would foreclose "new technologies ... that make more evident the precise nature of the burdens gerrymanders impose on the representational rights of voters and parties." *Vieth*, 541 U.S. at 312 (Kennedy, J., concurring). In particular, ongoing developments in the application of supercomputing to redistricting hold new promise for drawing compelling statistical inferences regarding the relationship (if any) between partisan considerations and legitimate legislative objectives in the construction of a plan. *See* Sachet Bangia *et al.*, *Redistricting: Drawing the Line*, at https://arxiv.org/abs/1704.03360 (visited Aug. 7, 2017) (using a Markov Chain Monte Carlo algorithm to produce thousands of "random but reasonable redistrictings" from which outlier redistrictings can be identified); Jowei Chen & Jonathan Rodden, *Cutting Through the Thicket: Redistricting Simulations and the Detection of Partisan Gerrymanders*, 14 ELECTION L.J. 331, 344 (2015) (generating a set of maps that could be used as a "transparent benchmark that solves all of the [non-partisan] districting challenges at least as well as the humans drawing the plan under review"); Wendy K. Tam Cho & Yan Y. Liu, *Toward a Talismanic Redistricting Tool: A Computational Method for Identifying Extreme Redistricting Plans*, 15 ELECTION L.J. 351, 363-64 (2016) (describing the use of computational map-drawing tools "to separate how the population patterns in the state constrain the map making and how the partisan motivations might alter the creation of maps"); Yan Y. Liu *et al.*, *PEAR: A Massively Parallel Evolutionary Computation Approach for Political Redistricting Optimization and Analysis*, 30 SWARM & EVOLUTIONARY COMP. 78, 89 (2016) (using a massively powerful supercomputer to generate a large set of feasible maps for statistical analysis of challenged maps to determine, inter alia, whether "the shift toward a Republican or Democratic bias [is] a function of

infra make clear, partisan goals guided the generation of map alternatives throughout Act 43's drafting process, and legitimate legislative objectives were consulted only as feasibility constraints.

C. The Panel's findings support the determination that Act 43's drafters applied political classifications in a way unrelated to any legitimate legislative objective.

1. The Panel found that the process of alternative map generation resulting in Act 43's drafting was suffused with partisan considerations.

The Panel found from the trial evidence that "[t]he drafters' concern with the durable partisan complexion of the new Assembly map was present from the outset of the legislative process." *Whitford*, 218 F.Supp.3d at 890. As "[o]ne of their first orders of business," the drafters developed, and had Professor Ronald Keith Gaddie validate, a "composite partisan score ... which would allow them to assess the partisan make-up of the new districts." *Id.* at 890-91. Over the next several months, the drafters engaged in an iterative process of generating alternative maps and computing their partisan scores. *Id.* at 891-92. The drafters also had Professor Gaddie perform a sensitivity analysis by creating an "S" curve for each map showing the expected relationship between the GOP's statewide legislative vote share and the GOP's share of seats in the state legislature under a range of election scenarios. *Id.* at

---

shifting demographics and population migration or ... the motivations of the partisan line drawers [are] the driving force").

892. The drafters used spreadsheets to evaluate the expected degree of partisan advantage at each iteration, and even reflected this evaluation in the names of many of the alternative maps. *Id.* at 922-23.

The drafters' first two statewide plans managed to increase the expected number of Republican wins from 49 to as many as 56, while decreasing the expected number of swing seats from 19 to as few as 12. *See id.* at 922. The drafters nevertheless were "[a]pparently not satisfied with the political performance of [their] early plans," and subsequently "produced and evaluated at least another six statewide maps," in which the expected number of Republican wins ranged from 57 to 60, and the expected number of swing seats ranged from 6 to 11. *See id.* The drafting process culminated in a June 2011 meeting where the Republican leadership drafted a Team Map as an amalgamation of regional maps "pulled" from previous drafts. *Id.* at 921-23. The Team Map "underwent even more partisan scrutiny" than any of the previous drafts, as well as Professor Gaddie's sensitivity analyses. *Id.* at 893-94. Under the Team Map, the expected number of Republican wins was 59, and the expected number of swing seats was 10. *See id.* at 893. After slight modifications to the Team Map, *see id.* at 893 n.208, the drafters presented the final districts for Republican members to review in conjunction with historical data on partisan election performance. *Id.* at 894. The final plan subsequently passed both houses of the legislature and was signed into law as Act 43. *Id.* at 853.

2. The Panel's findings support the determination that Act 43's drafters

consulted traditional districting principles and other legitimate legislative objectives only as feasibility constraints.

The Panel found that the drafters "were attentive to various traditional districting criteria like population equality, compactness, and municipal splits throughout the drafting process," *id.* at 849, but the defendants failed to identify any evidence that the drafters ever compared drafts with respect to those criteria. *Id.* at 921 ("[T]he defendants have not pointed us to any documents in the record that compare the various maps under consideration according to traditional district criteria.").[4]

More specifically, the Panel found that the drafters "were able to generate various reports through the autoBound software that evaluated the plan on these different districting criteria." *Id.* The Panel also inferred that the drafters used the autoBound reports to check that each of "the finalized statewide plans for which we have partisan performance spreadsheets in the record complied satisfactorily with the other districting criteria that the drafters

---

[4] *See also id.* at 849 (quoting R.148 at 83) (describing an "'eyeball test' for 'compactness and contiguousness'" and checks for compliance with principles of population equality, core retention, respect for political subdivisions and communities of interest, and protection of incumbents, but not describing any comparisons between drafts with respect to any of these traditional districting criteria). The Panel acknowledged that the drafters did prepare a spreadsheet on disenfranchisement, *id.* at 921 n.359, but discounted this in light of the defendants' failure to identify any evidence to suggest that "measures of traditional districting criteria were being scrutinized on a regular basis or with the intensity that partisan scores were being evaluated." *Id.* at 892 n.195.

considered," because rational actors "would not have pulled regional alternatives from [non-compliant maps] to present to the legislative leadership." *See id.* at 922. But the drafters' practice was to export only the "'[partisan] composite column'" of the autoBound reports to the spreadsheets used for plan comparison purposes. *Id.* at 921 (quoting trial testimony of Adam Foltz) (alteration in original opinion). Even in the final review, the drafters "did not provide the individual legislators with any information about contiguity, compactness, or core population" to consider in their comparative assessments of the plan. *Id.* at 894.

Thus, the drafters consistently consulted traditional districting principles as feasibility constraints, and not as objectives for comparative evaluation, throughout the process of drafting Act 43. *Cf.* THOMPSON & MARTIN, *supra*, at 279 (providing an example of computer-assisted decision making where legal compliance functions as a feasibility constraint).

3. Act 43 bore the hallmarks of a drafting process wherein partisan considerations were applied as goals and traditional districting principles were consulted only as feasibility constraints.

There are no features in the Team Map to indicate that improvements with respect to traditional districting criteria were ever pursued as intended objectives of the iterative drafting process. Beyond the lack of evidence that the drafters ever compared any plans with respect to traditional districting criteria, *see supra*, there was no evidence that the Team Map representing the culmination of that

process performed appreciably better with respect to those criteria than previous drafts or Assembly plans in previous cycles. *See Whitford*, 218 F.Supp.3d at 911-12 ("[T]he defendants' own witnesses ... credibly established that Act 43's drafters produced multiple alternative plans that would have achieved the legislature's valid districting goals while generating a substantially smaller partisan advantage."); *id.* at 940 (Griesbach, J., dissenting) ("The current plan's compactness scores are comparable to previous plans").

In contrast, the Panel found that "[t]he Team Map, as an amalgamation of several statewide plan alternatives, reflect[ed] the drafters' iterative efforts throughout the drafting process to achieve a substantial, if not maximal, partisan advantage." *See id.* at 923.[5] From a "[c]areful review of the record," the Panel inferred that partisan considerations -- including estimates of the expected numbers of Republican and swing seats and Professor Gaddie's sensitivity analyses -- guided the drafters in "making incremental 'improvements' to their plan alternatives throughout the drafting process." *See id.* at 922. For example, when the drafters were "[a]pparently not satisfied with the political performance of [two] early plans, the drafters produced at least another six statewide maps," each of which "improved upon the anticipated pro-Republican advantage generated in the initial two draft plans." *See id.* at 923. Thus, regardless of whether the drafters sought as rational partisan actors to achieve a "substantial" advantage (through satisficing) or a "maximal" advantage

[5] The Team Map underwent only minor changes before the plan's enactment as Act 43. *See id.* at 893 n.208.

(through constrained optimization), their intended goals apparently included achieving an advantage beyond that conferred by either of the first two unsatisfactory plans (56 expected Republican seats and 12 expected swing seats), and evidently were satisfied by the Team Map (59 expected Republican seats and 10 expected swing seats). *See id.* at 898 ("It is clear that the drafters got what they intended to get.").

Overall, the Panel's detailed factfinding casts the disjunction between partisan goals and compliance constraints in Act 43's drafting process into sharp relief. The Panel found that from start to finish, the drafters' iterative efforts were guided at least in part by the goal of increasing the Republicans' expected partisan advantage, while any considerations of traditional districting criteria were limited to checks for compliance. These findings provide ample support for the determination that the drafters applied partisan considerations to generate and evaluate plans, and ultimately Act 43, in a way unrelated to the pursuit of any legitimate legislative objective.

II. This Court should affirm the Panel's causal determination that partisan considerations in the drafting of Act 43 had the likely effect of entrenching a Republican partisan advantage throughout the life of the plan.

This Court has defined partisan gerrymandering as "the drawing of legislative district lines to subordinate adherents of one political party and entrench a rival party in power," *Arizona State Legislature v. Arizona Independent Redistricting Com'n*, 135 S.Ct. 2652, 2658 (2015), but has not yet established a doctrinal test for unlawful partisan entrenchment. *See Vieth*, 541 U.S. at 366 (Breyer, J.,

dissenting) (proposing tests for "unconstitutional entrenchment"); *id.* at 299-301 (rejecting Justice Breyer's proposed tests); *id.* at 308 (Kennedy, J., concurring in the judgment) (same); *see also Whitford*, 218 F.Supp.3d at 927 (acknowledging that a decennial entrenchment standard "is not settled in Supreme Court jurisprudence"). To the extent that "a reliable standard for identifying unconstitutional political gerrymanders," *LULAC*, 548 U.S. at 424, may entail quantitative factfinding concerning partisan entrenchment, this brief calls for an approach to appellate review of that factfinding that affords a trial court discretion to draw causal inferences that are substantially supported by reliable scientific evidence.

At trial, the plaintiffs presented observational and statistical evidence and expert testimony to establish a causal link between the drafters' use of partisan considerations and their intended effect of "solidifying Republican control of the legislature for the decennial period." *Whitford*, 218 F.Supp.3d at 863-64. As explained *infra*, the Panel admitted and weighed this evidence without abusing its discretion or committing clear error, and the record of this case provides substantial support for each of the Panel's inferences and findings. The Panel's conclusion that the effect of partisan considerations in the drafting of Act 43 was to entrench a Republican partisan advantage throughout the life of the plan should therefore be affirmed.

A. The Panel's causal determination is entitled to deference on appeal, especially in light of the technical nature of this determination.

The Panel determined that "the plaintiffs have shown causation: Act 43 was designed with the purpose of solidifying Republican control of the legislature for the decennial period and, indeed, has had that effect." 218 F.Supp.3d at 863-64. The Panel reached this causal determination in its capacity as factfinder, and is entitled to deference on appeal. *See Sedor v. Frank*, 42 F.3d. 741, 746 (2d Cir. 1994) (citing *U.S. Postal Service Board of Governors v. Aikens*, 460 U.S. 711, 716 (1983)) ("Matters of motive and causation are questions of fact, and findings on these issues by the court as factfinder after a trial may not be properly be overturned unless they are clearly erroneous.").

In reaching its causal determination, the Panel reviewed the entire record of the case, 218 F. Supp.3d at 843-62, and weighed evidence concerning "the actual election results for 2012 and 2014, the swing analyses performed by Professors Gaddie and Mayer, as well as the plaintiffs' proposed measure of asymmetry, the efficiency gap" ("EG"), in light of the drafters' partisan intent. *Id.* at 898. The Panel's weighing of this evidence is entitled to deference under the clear error standard of review. *See Anderson v. Bessemer City*, 470 U.S. 564, 573-74 (1985) ("If the district court's account of the evidence is plausible in light of the record viewed in its entirety, the court of appeals may not reverse it even though convinced that had it been sitting as the trier of fact, it would have weighed the evidence differently."). Great deference is especially warranted with respect to the Panel's weighing of statistical evidence. *See Soria v. Ozinga Bros., Inc.*, 704 F.2d 990, 994 n.6 (7th Cir. 1983) (citing *Dothard v. Rawlinson*, 433 U.S. 321, 338 (1977) (Rehnquist, J.,

concurring)) ("Moreover, especially where statistical evidence is involved, great deference is due the district court's determination of whether the resultant numbers are sufficiently probative of the ultimate fact in issue.").

The Panel's decisions regarding the admissibility of scientific evidence in this case are also entitled to wide deference. *See General Elec. Co. v. Joiner*, 522 U.S. 136, 146 (1997) ("We hold, therefore, that abuse of discretion is the proper standard by which to refer a district court's decision to admit or exclude scientific evidence."); *United States v. Abel*, 469 U.S. 45, 54 (1984) ("A district court is accorded a wide discretion in determining the admissibility of evidence under the Federal Rules.").

B. The Panel properly weighed the evidence relating to the plaintiffs' causal and predictive claims.

The effect prong of a partisan gerrymandering claim may require a prediction of future election results. *Compare Davis v. Bandemer*, 478 U.S. 109, 142 (1986) ("[T]he district configurations may be combined with vote projections to predict future election results, which are also relevant to the effects showing.") *with Vieth*, 541 U.S. at 287 & n.8 (describing difficulties in predicting election results that would "make it impossible to assess the effects of partisan gerrymandering" under the appellants' proposed test).

Accordingly, the plaintiffs addressed the discriminatory effect prong by presenting evidence to support both a causal claim and a predictive claim. The causal claim is that partisan considerations in the drafting of Act 43 were a substantial cause of the

Republican partisan advantages observed in the 2012 and 2014 election results. The predictive claim is that given the extent of the partisan advantages observed in 2012 and 2014, Republicans will likely continue to enjoy a partisan advantage for the life of Act 43.

1. The Panel properly weighed the evidence relating to the plaintiffs' causal claim that partisan considerations in the drafting of Act 43 were a substantial cause of the Republican partisan advantages observed in 2012 and 2014.

The Panel found that the Republicans achieved significant partisan advantages under Act 43 as revealed by the results of the 2012 and 2014 elections, *see Whitford*, 218 F.Supp.3d at 899, and summarized by the EG metric. *See id.* at 905-06.[6] In inferring the causes of these advantages, the Panel reviewed observational and statistical evidence and expert testimony and entered findings addressing both general and specific causation.[7]

---

[6] The efficiency gap is a measure of partisan advantage that "represents the difference between the parties' respective wasted votes in an election — where a vote is wasted if it is cast (1) for a losing candidate, or (2) for a winning candidate but in excess of what she needed to prevail." Nicholas O. Stephanopoulos & Eric M. McGhee, *Partisan Gerrymandering and the Efficiency Gap*, 82 U. CHI. L. REV. 831, 834 (2015); *see also* Eric McGhee, *Measuring Partisan Bias in Single-Member District Electoral Systems*, 39 LEGIS. STUD. Q. 55, 68 (2014) (introducing and referring to this measure as "relative wasted votes").

[7] As the terms have been used in the toxic tort setting, "[g]eneral causation is whether a substance is capable of causing a particular injury or condition in the general

Addressing general causation, the Panel credited Professor Jackman's explanation of the mathematical basis for the tendency of partisan packing and cracking efforts[8] to cause an absolute increase in the EG as measured from subsequently observed electoral results. *See id.* at 903 (citing Simon Jackman, *Assessing the Current Wisconsin State Legislative Districting Plan* at 15 (July 7, 2015) ("Jackman Expert Report")).

The Panel's findings addressed the specific causation issue through a form of process-of-elimination reasoning. As reviewed *supra*, the Panel's findings on discriminatory effect and

---

population, while specific causation is whether a substance caused a particular individual's injury." *Knight v. Kirby Inland Marine Inc.*, 482 F.3d 347, 351 (5th Cir. 2007) (citation omitted).

While controlled experimental studies are often referred to as the "gold standard" for causal inference, *see e.g.*, *TMJ Implants, Inc. v. Aetna, Inc.*, 498 F.3d 1175, 1195 (10th Cir. 2007) (referring to "the gold standard of a double-blind study"), controlled experiments are not commonly employed in expert testimony. *See* David H. Kaye & David A. Freedman, *Reference Guide on Statistics*, *in* FEDERAL JUDICIAL CENTER, REFERENCE MANUAL ON SCIENTIFIC EVIDENCE 83, 94 (3d ed. 2011) ("The bulk of the statistical studies seen in court are observational, not experimental."). In particular, a state's voters cannot be split into treatment and control groups to test the partisan effect of a statewide districting plan relative to another plan. *Cf.* Nicholas Stephanopoulos, *Race, Place, and Power*, 68 STAN. L. REV. 1323, 1401 n.385 (2016) ("[T]here may not be a satisfactory treatment group and control group [for measuring Gingles's impact], given the decision's consequences throughout the country.").

[8] "'Packing' refers to the practice of filling a district with a supermajority of a given group or party. 'Cracking' involves the splitting of a group or party among several districts to deny that group or party a majority in any of those districts." *Vieth*, 541 U.S. at 286 n.7 (plurality opinion).

justification served to credit Act 43's partisan drafting process as a possible cause of the Republican advantages observed in 2012 and 2014, *see Whitford*, 218 F.Supp.3d at 923 (concluding that the Team Map that became Act 43 "reflect[ed] the drafters' iterative efforts throughout the drafting process to achieve a substantial, if not maximal, partisan advantage"); *id.* at 899 ("The 2012 and 2014 election results reveal that the drafters' design in distributing Republican voters to secure a legislative majority was, in fact, a success.").

The Panel's findings on justification also served to rule out "legitimate state prerogatives and neutral factors that are implicated in the districting process" as sufficient causes of the observed Republican advantages. *See id.* at 911. Specifically, the Panel found that "Wisconsin's political geography ... affords the Republican Party a natural, but modest, advantage in the districting process," *id.* at 921,[9] but "cannot explain the magnitude" of the partisan advantages observed in 2012 and 2014. *Id.* at 924. The Panel credited Professor Mayer's Demonstration Plan as evidence tending to exclude the drafters' efforts to comply with various constitutional and

---

[9] To reach these findings, the Panel weighed evidence presented by the defendants' experts to show "that Wisconsin's political geography naturally favors Republicans because Democratic voters reside in more geographically concentrated areas, particularly in urban centers like Milwaukee and Madison." *See id.* at 912. The Panel identified deficiencies in the testimony of the defendants' experts Sean Trende, *see id.* at 914-15, and Professor Goedert, *see id.* at 916, but also discounted an effort by plaintiffs' expert Professor Mayer to rebut Professor Goedert's analysis, *see id.* at 916-18, and found support for the defendants' theory in Professor Mayer's testimony and Demonstration Plan. *See id.* at 919-21.

Voting Rights Act requirements, given Wisconsin's political geography, as explanatory causes of the partisan advantage observed in 2012. *See id.* at 924-26.[10] Finally, the Panel found the drafters' testimony inadequate to rule in their consideration of core retention, Senate election disenfranchisement, and incumbency protection as plausible causes of the "electoral imbalance" observed after the enactment of Act 43. *See id.* at 925-26.[11]

This process-of-elimination approach to causal inference is familiar to the field of epidemiological evidence, where the approach is referred to as "differential etiology." *See, e.g.*, *Wood v. Textron, Inc.*, 807 F.3d 827, 832 n.4 (7th Cir. 2015) (quoting FEDERAL JUDICIAL CENTER, REFERENCE MANUAL ON SCIENTIFIC EVIDENCE 214 (1994)) ("A differential etiology is a process-of-elimination approach to determining a subject's cause of injury. Under this method, an expert 'considers all relevant potential causes of the symptoms and then eliminates

---

[10] The Panel considered a Demonstration Plan presented by Professor Mayer that was "'comparable to Act 43' with respect to 'all constitutional requirements," including population equality, majority-minority districts, compactness, and respect for political subdivisions, *id.* at 924, but achieved an EG of 2.2% based on the 2012 election results, compared with Act 43's EG of 11.69%. *See id.* at 920.

[11] The Panel reviewed testimony indicating that the drafters considered core retention and Senate election disenfranchisement, but failing to specify "how much th[ese] consideration[s] actually factored into the drafting process." *Id.* at 925-26. The Panel also credited testimony that the drafters' consideration of incumbency protection was reflected in Act 43, which protected 13 more incumbents than the Demonstration Plan, but noted the defendants' failure to argue that "the location of incumbents ... accounts for the electoral imbalance" observed after Act 43's enactment. *See id.* at 926.

alternative causes.'"); *Westberry v. Gislaved Gummi AB*, 178 F.3d 257, 262 (4th Cir. 1999) (citations omitted) (referring to differential etiology as "a standard scientific technique of identifying the cause of a medical problem by eliminating the likely causes until the most probable one is isolated" and noting that "[t]his technique 'has widespread acceptance in the medical community, has been subject to peer review, and does not frequently lead to incorrect results'").

The differential etiology approach is premised on the logic that "[e]liminating other known and competing causes increases the probability that a given individual's disease was caused by exposure to the agent." Michael D. Green *et al.*, *Reference Guide on Epidemiology*, *in* FEDERAL JUDICIAL CENTER, REFERENCE MANUAL ON SCIENTIFIC EVIDENCE 549, 617 (3d ed. 2011). Thus, "although differential etiologies are a sound methodology in principle, this approach is only valid if general causation exists and a substantial proportion of competing causes are known." *Id.* at 618. Even so, the underlying logic generalizes beyond epidemiology, which has allowed differential etiology to become "the predominant methodology — at least as recognized by courts today — for reasoning from general causation to specific causation." *See* David L. Faigman *et al.*, *Group to Individual (G2i) Inference in Scientific Expert Testimony*, 81 U. CHI. L. REV. 417, 436 n.79 (2014).

The toxic torts caselaw provides further guidance on the proper weighing of causal inferences based on a differential etiology. "In attacking the differential diagnosis performed by the plaintiff's expert, the defendant may point to a plausible cause of the plaintiff's illness other than the defendant's actions.

It then becomes necessary for the plaintiff's expert to offer a good explanation as to why his or her conclusion remains reliable." *Kannankeril v. Terminix Int'l, Inc.*, 128 F.3d 802, 808 (3rd Cir. 1997) (citation omitted); *see also Westberry*, 178 F.3d at 265 (quoting *Heller v. Shaw Industries, Inc.*, 167 F.3d 146, 156-57 (3rd Cir. 1999)) (alteration in original) ("The alternative causes suggested by a defendant 'affect the weight that the jury should give the expert's testimony and not the admissibility of that testimony,' unless the expert can offer 'no explanation for why she has concluded [an alternative cause offered by the opposing party] was not the sole cause.'").

The Panel's process-of-elimination approach to specific causation complied with each of these precepts of valid differential etiology. The Panel found that "general causation exists" in the EG's mathematical capture of partisan packing and cracking efforts. *Compare* Green, *supra*, at 618, *with Whitford*, 218 F.Supp.3d at 903. The Panel's findings on discriminatory effect and justification, *see Whitford*, 218 F.Supp.3d at 899, 923, supported the characterization and ruling-in of Act 43's partisan drafting process as a specific instance of this general causation. The Panel considered and reliably ruled out "a substantial proportion of competing causes" of the observed partisan advantage, including the catch-all category of Wisconsin's political geography. *Compare* Green, *supra*, at 618, *with Whitford*, 218 F.Supp.3d at 921-27. The Panel also discounted the drafters' legal compliance efforts as alternative causal explanations in light of Professor Mayer's Demonstration Plan. *Compare Kannankeril*, 128 F.3d at 808, *with Whitford*, 218 F.Supp.3d at 924-26.

Finally, the Panel found that the defendants' testimony on core retention, Senate election disenfranchisement, and incumbency protection was insufficient to warrant consideration of these factors as plausible causes of the observed partisan advantage. *Compare Kannankeril*, 128 F.3d at 808, *with Whitford*, 218 F.Supp.3d at 925-26. Having thereby ruled in the drafters' partisan considerations as a substantial cause and ruled out all other proffered explanations as insufficient or implausible causes of the Republican partisan advantages observed in 2012 and 2014, the Panel's findings validly addressed both the general and specific aspects of the plaintiffs' causal claim.

2. The Panel properly weighed the evidence relating to the plaintiffs' predictive claim that given the extent of the partisan advantages observed in 2012 and 2014, Republicans will likely continue to enjoy a partisan advantage for the life of Act 43.

In inferring the likelihood of an enduring Republican partisan advantage under Act 43, the Panel drew on "the predictive work" embodied in Professor Gaddie's "S" curves and Professor Mayer's swing analysis. *Whitford*, 218 F.Supp.3d at 903.

Professor Gaddie's "S" curves provided the drafters with his prediction of "the electoral outcome for each map" in the event of a statewide swing in partisan support resulting in a "Republican statewide vote percentage ranging from 40% to 60%." *See id.* at 899. The "S" curves predicted a Republican partisan advantage in translating votes to seats across a wide range of election outcomes. *See id.* at 899 n.257 (reproducing data from the Team Map "S" curve in a

table showing that any given statewide vote share between 47% and 54% would translate to 14–19 more seats for Republicans than for Democrats). For example, the Team Map "S" curve predicted that in the event of a statewide swing resulting in a 50-50 vote split, Republicans would win 58 seats and Democrats would win 41. *See id.* Similarly, the Panel pointed out that to "maintain a comfortable majority" of 54 seats, Republicans would need a 48% statewide vote share, but Democrats would require more than 54%. *Id.* at 899.

Professor Mayer's swing analysis showed, *inter alia*, that the pro-Republican EG observed under the actual 2012 election results would largely persist even in the event of a statewide swing in partisan support of either 5% away from or 3% toward the Democrats. *See* Tr. Ex. 117; Kenneth Mayer, *Rebuttal Report: Response to Expert Reports of Sean Trende and Nicholas Goedert* (Dec. 21, 2015), at 27 (predicting an EG of 8.80% under a "D Minus 5" swing and an EG of 10.71% under a "D Plus 3" swing, with Democrats winning a minority of seats in both cases). Professor Mayer selected this range of "*likely* election scenarios" based on the extrema of the Democrats' historical vote share from 1992 to 2012. *See Whitford*, 218 F.Supp.3d at 900 (citing Tr. Ex. 117) (emphasis in original).

When weighing Professor Gaddie's "S" curves and Professor Mayer's swing analysis, the Panel kept in mind Justice Kennedy's caution against "adopting a constitutional standard that invalidates a map based on unfair results that would occur in a hypothetical state of affairs." *Whitford*, 218 F.Supp.3d at 903 (quoting *LULAC*, 548 U.S. at 419 (opinion of Kennedy, J.)). The Panel noted that Professors

Gaddie's and Mayer's predictions depended on "a hypothetical state of affairs," in that uniform statewide swings in partisan vote share are not observed between actual elections. *See id.* Both sets of predictions, however, had been confirmed by "the results of two actual elections in which the feared inequity did arise." *Id.* at 903.

Further corroborating Professors Gaddie's and Mayer's predictions, Professor Jackman independently investigated the historical durability of partisan advantage as indicated by the sign and magnitude of the EG observed across elections throughout the life of a districting plan.[12] *See* Jackman Expert Report, *supra*, at 55. Professor Jackman performed a statistical analysis of "786 state legislative elections (under 206 different districting plans) in the United States between 1972 and the present day." *Whitford*, 218 F.Supp.3d at 860. Professor Jackman testified that the 13% and 10% pro-Republican EGs observed in 2012 and 2014 were historical outliers, with the average observed EG of Act 43 ranking fifth among the 206 districting plans. *See id.* at 861.

Professor Jackman estimated the probability of observing a change of sign in the EG during the lifetime of a plan, conditional on one or more

---

[12] The scope of this brief does not extend to address the defendants' "legal, methodological, and policy-based attacks against judicial use of the EG as a measure of a district plan's partisan effect," *Whitford*, 218 F.Supp. at 906, other than to argue *infra* that the Panel properly inferred from Professor Jackman's estimate of a "plan-average pro-Republican efficiency gap of 9.5%" that "the Republicans' ability to translate their votes into seats will continue at a significantly advantageous rate through the decennial period." *See id.* at 909.

observations of extreme EGs in previous elections under the plan. *See* Jackman Expert Report, *supra*, at 56-59. He found "in the post-1990 era, if a plan's first election yields EG $\leq -.13$, we *never* see a subsequent election under that plan yielding a pro-Democratic efficiency gap." *Id.* at 60 (emphasis in original). Professor Jackman also used a regression analysis to predict that "Wisconsin's plan would have an average pro-Republican efficiency gap of 9.5% for the entire decennial period." *Whitford*, 218 F.Supp.3d at 905 (citing Simon Jackman, *Rebuttal Report* at 15-17 (Dec. 21, 2015)). Based on these findings, Professor Jackman testified that "[b]arring an 'unprecedented political earthquake,' Democrats would be at an electoral disadvantage for the duration of Act 43." 218 F.Supp.3d at 905.

Professor Jackman validated his methodology and findings on the durability of the Republicans' partisan advantage under Act 43 both externally and internally. Externally, Professor Jackman's conducted a sensitivity analysis based on the actual 2012 Wisconsin election results, finding that "even with a 5% swing in the Democrats' favor, the EG would not drop below 7%." *Id.*; *cf.* Tr. Ex. 117 (showing Prof. Mayer's finding of an EG of 10.71% under a 3% swing in the Democrats' favor).

Recognizing "demographic drift" over time and the many other "election-specific factors [that] will contribute to election-to-election variation in the efficiency gap,"[13] Professor Jackman also internally

---

[13] *Compare* Jackman Expert Report, *supra*, at 48 ("[D]istricts will display 'demographic drift,' generally changing the political complexion of those districts. Incumbents lose, retire or die in office; sometimes incumbents face major opposition, sometimes they don't. Variation in turnout ... will also cause the

validated the use of one or more observed EGs as a predictor of the sign and magnitude of future EGs during the lifetime of a districting plan. *See* Jackman Expert Report, *supra*, at 48. Specifically, Professor Jackman's regression analysis showed that "[a]bout 76% of the variation in the EG estimates is between-plan variation," dwarfing the "within-plan" variation attributable to all of the election-specific factors that may change during a plan's lifetime. *Id.*

Professor Jackman's other methodological choices reflected great care to ensure the validity of his findings. Professor Jackman sought to guarantee reproducibility and avoid the introduction of selection bias by using a large, canonical, publicly available data set of state legislative elections results. *See id.* at 2 (identifying the data set as "ICPSR study number 34297" and providing a Web link). He also addressed the heterogeneity inherent in an observational study of historical election results by performing a separate analysis in which he matched the 2012 and 2014 observations under Act 43 with the (relatively few) "cases with a similar history of EG measures." *Compare id.* at 63 with PAUL R. ROSENBAUM, DESIGN OF OBSERVATIONAL STUDIES 277-78 (2010) (describing matching for observed covariates to address heterogeneity in an observational study).[14]

---

distribution of vote shares to vary from election to election") *with Vieth*, 541 U.S. at 287 (plurality opinion) ("Political affiliation is not an immutable characteristic, but may shift from one election to the next, and even within a given election, not all voters follow the party line.").

[14] Professor Jackman also fully acknowledged and accounted for the statistical imprecision in EG introduced through the use of presidential election results and regression models to impute

In summary, the evidence presented by Professor Jackman at trial provided ample support for his "virtually certain" prediction that, given the EGs observed in 2012 and 2014, "Act 43 will exhibit a large and durable advantage in favor of Republicans over the rest of the decade." *Whitford*, 218 F.Supp.3d at 861. Moreover, the analyses performed by Professors Gaddie and Mayer supported their testimony "that, consistent with what actually occurred in 2012 and 2014, under any *likely* electoral scenario, the Republicans would maintain a legislative majority." *Id.* at 899 (emphasis in original). The Panel did not err in its weighing of this evidence to find:

> [T]he Republican Party's comparative electoral advantage under Act 43 will persist throughout the decennial period; Democratic voters will continue to find it more difficult to affect district-level outcomes, and, as a result, Republicans will continue to enjoy a substantial advantage in converting their votes into seats and in securing and maintaining control of the Assembly.

Id. at 906.

CONCLUSION

The district court's conclusion that partisan considerations in the drafting of Act 43 had the

---

vote shares to uncontested districts. *See* Jackman Expert Report at 24-30 (explaining the imputations); *id.* at 36-43 (analyzing the uncertainty and statistical significance of EG estimates); *id.* at 48, 53, 56-58, 65-68 (providing analytical results that take into account uncertainty in EG estimates).

unjustifiable effect of entrenching a Republican partisan advantage throughout the life of the plan should be affirmed.

Respectfully submitted,

Andrew Chin
University of North Carolina
School of Law
160 Ridge Road, CB #3380
Chapel Hill, NC 27599-3380
(919) 962-4116

September 1, 2017

Counsel for Amici Curiae

APPENDIX — LIST OF SIGNATORIES*

Andrew Chin
Professor of Law
University of North Carolina School of Law

Gabriel J. Chin
Edward L. Barrett Jr. Chair and Martin Luther King Jr. Professor of Law
UC Davis School of Law

Ralph D. Clifford
Professor of Law
University of Massachusetts School of Law

John Martin Conley
William Rand Kenan Jr. Professor of Law
University of North Carolina School of Law

Ira Ellman
Charles J. Merriam Distinguished Professor of Law Emeritus
Arizona State University College of Law

Jeffrey Fagan
Isidor and Seville Sulzbacher Professor of Law
Columbia Law School

---

* The views expressed in this brief are those of the individual signatories and not those of the institutions with which they are affiliated.

Barbara A. Fedders
Assistant Professor of Law
University of North Carolina School of Law

Barry Feld
Centennial Professor of Law Emeritus
University of Minnesota Law School

Eric Fink
Associate Professor of Law
Elon University School of Law

Brandon L. Garrett
Justice Thurgood Marshall Distinguished Professor of Law
White Burkett Miller Professor of Law and Public Affairs
University of Virginia School of Law

Jonah B. Gelbach
Professor of Law
University of Pennsylvania Law School

Tracey E. George
Charles B. Cox III and Lucy D. Cox Family Chair in Law and Liberty
Vanderbilt Law School

Kimberly Cogdell Grainger
Professor
North Carolina Central University School of Law

Hosea H. Harvey
Associate Professor of Law and Political Science
Temple University Beasley School of Law

Bruce Hay
Professor of Law
Harvard Law School

Yaniv Heled
Associate Professor of Law
Georgia State University College of Law

Donald Thomas Hornstein
Aubrey L. Brooks Professor of Law
University of North Carolina School of Law

Tonja Jacobi
Professor of Law
Northwestern Pritzker School of Law

Michael S. Jacobs
Distinguished Research Professor of Law Emeritus
DePaul University College of Law

Eric Kades
Thomas Jefferson Professor of Law
William & Mary Law School

Jay P. Kesan
Professor and Workman Research Scholar
University of Illinois College of Law

Morgan Kousser
William R. Kenan, Jr., Professor of History and Social Science
California Institute of Technology

Mark A. Lemley
William H. Neukom Professor
Stanford Law School

Richard A. Leo
Hamill Family Professor of Law and Psychology
University of San Francisco School of Law

David Levine
Associate Professor of Law
Elon University School of Law

Robert J. MacCoun
James & Patricia Kowal Professor of Law
Stanford Law School

M. Isabel Medina
Ferris Family Distinguished Professor of Law
Loyola University New Orleans College of Law

John Monahan
Shannon Distinguished Professor of Law
University of Virginia School of Law

Perry Moriearty
Associate Professor of Law
University of Minnesota Law School

Myron Orfield Jr.
Earl R. Larson Professor of Civil Rights and Civil Liberties Law
University of Minnesota Law School

Gregory S. Parks
Professor of Law
Wake Forest University School of Law

Frank Pasquale
Professor of Law
University of Maryland Carey School of Law

Dorit Rubinstein Reiss
Professor of Law
UC Hastings College of the Law

D. Michael Risinger
John J. Gibbons Professor of Law
Seton Hall University School of Law

Andrea Roth
Assistant Professor of Law
UC Berkeley School of Law

Matthew Sag
Professor of Law
Loyola University Chicago School of Law

Christopher L. Sagers
Professor of Law
Cleveland State University College of Law

Nathan A. Schachtman
Lecturer in Law
Columbia Law School

Francis X. Shen
McKnight Land-Grant Associate Professor of Law
University of Minnesota Law School

Steph Tai
Associate Professor of Law
University of Wisconsin Law School

James Alexander Tanford
Professor Emeritus
Indiana University Maurer School of Law

Kathleen DeLaney Thomas
Assistant Professor of Law
University of North Carolina School of Law

Michael Tonry
McKnight Presidential Professor in Criminal Law and Policy
University of Minnesota Law School

Neil Vidmar
Russell M. Robinson II Professor Emeritus of Law
Duke Law School